

Classification 3: Major Insect Orders Mini-Book

Middle School Scientists Curriculum

Class Time Required:

1 class period (50-65 minutes)
Extension (Up to 4 hours)

Materials Needed:

- Engagement: PowerPoint 1, "Classification 3: Major Insect Orders Mini-Book"
- Investigation and Explanation: Computer Paper, Scissors, Colored Pencils, Resource Materials (books, textbooks, internet)
- Extension: Equipment to Collect Insects or Ability to Take Pictures of Insects

Teacher Preparation: 30-60 minutes to review activity, collect materials, and make copies

Student Knowledge: research skills; observational skills

Vocabulary: characteristic; levels of classification: kingdom, phylum, class, order, family, genus, species

Next Generation Science Standards:

• MS-LS4-2.

Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

• MS-LS4-1, MS-LS4-2 Crosscutting Concepts

Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.

Overview:

Insects play an important role in our lives and are the most common organisms on Earth. There are some insects that can harm you or damage crops, but the majority of insects are good for the environment. They help us to pollinate our plants, are an integral part of food webs, make products that we can use, and recycle wastes. They are easy to observe and catch in any type of environment. There are over thirty identified orders within the Class Insecta. This activity familiarizes students with the six most populous orders of insects by producing Mini-Books with the name of each order on a separate page, examples of common insects in that order, a picture, identifying characteristics, and an interesting fact.

Background Information:

There are more insects than any other organisms on Earth. Insects are in the Phylum Arthropoda, identified by their jointed legs, segmented bodies, and exoskeletons. All insects have these characteristics, but other characteristics further define Class Insecta: three pairs of jointed legs, bodies that have three segments, one pair of antennae, and usually two pairs of wings (some groups have one pair or none). ("What Is", 2014)

This activity focuses on the six largest orders of insects, based on number of identified species in that order. The graph below includes information about each order including their identifying characteristics (Moisset, 2008; "Insect Orders", 2014):

Order name	Common name	Identified Species	Characteristic	Characteristic Description
Coleoptera	Beetles	400,000	"hard wing"	Pair of hardened wings meet in straight line down back
Lepidoptera	Butterflies, moths	150,000	"scaly wings"	Two pairs of large wings covered with small scales
Hymenoptera	Bees, wasps, ants (only have wings at certain times during life cycle or not at all)	130,000	"membrane wings"	Two pairs of thin, clear membranous wings; front pair larger than rear
Diptera	Flies, midges, mosquitoes	120,000	"two pairs of wings" although second pair is reduced in size	One pair of wings; second pair is reduced in size and often not seen
Hemiptera	True bugs, cicadas, aphids	82,000	"half wings"	Triangle on back behind the head formed by the wings
Orthoptera	Grasshoppers, crickets, katydids	20,500	"straight wings"	Four wings, front ones thickened; jumping hind legs

Focus Questions:

What are identifying characteristics of an insect?

What are the different major orders of insects and how can you tell them apart?

Where do you find insects and how can you capture/photograph them?

**Learning Target:**

I can identify insects and the characteristics that place them in the six most common insect orders.

Engagement:

(10-15 minutes)

Project the image from the PowerPoint 1, “Classification 3: Major Insect Orders Mini-Book” that shows an insect from each of the six major insect orders. Ask students to make observations about the insects....How they are alike? How they are different? Guide students toward understanding that how they are alike answers the question: “What makes an insect an insect?” How they are different answers the question: “What is the major characteristic of each order?”

Investigation:

(25-30 minutes)

Students will create Mini-Books highlighting the primary characteristics of the six major orders of insects.

1. Each student needs a piece of computer paper and scissors to make their personal Mini-Book.

Directions for making a Mini-Book:

YouTube Video: <https://www.youtube.com/watch?v=21qi9ZcQVto>

Written Directions: <http://print-cut-paste-craft.com/instructions/prova-ho-to>

2. Students will create a front cover including a title, their name, and colored picture. On the back cover students will make up a publishing company name, logo for the company name, location, and copyright date.

3. On each of the six pages on the inside, students will add the name of the order, examples of common insects in that order, a picture, identifying characteristic, and an interesting fact. This information can be found in books, textbooks, or online. Coloring makes the Mini-Book more interesting and fun to read.

Explanation:

(15-20 minutes)

Students share their Mini-Books with others in the classroom and check books for completeness before turning into the teacher for a final grade.

Extension:

(Up to 4 hours)

Students are challenged to find an example of an insect from each of the six most populous orders. Presentation of their insects could be through a traditional insect collection of mounted insects or another option is to take a picture of an insect from each order, which is less destructive to the environment.

This website developed by Purdue University for 4-H is a great resource for teaching students about insects and shows several methods of collecting insects:
<http://extension.entm.purdue.edu/401Book/default.php?page=home>

References:

Gibb, Tim. "How to Make an Awesome Insect Collection | Purdue | Entomology | Insect | Collect | Supplies | Specimen | Mounting | Identifying | Displaying | Preserve | Labels." Purdue University, 2011. Web. 15 July 2014.
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Moisset, Beatrix. "Overview of Orders of Insects." *Welcome to BugGuide.Net! - BugGuide.Net*. Iowa State University Entomology, 6 Sept. 2008. Web. 10 July 2014.
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Staff, Writer. "Insect Orders." *Insect Orders*. Insect Identification Org, 3 Apr. 2014. Web. 09 July 2014. <http://www.insectidentification.org/orders_insect.asp>

"What Good Are Bugs? - National Wildlife Federation." *What Good Are Bugs? - National Wildlife Federation*. National Wildlife Federation, n.d. Web. 09 July 2014.
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